REMARKS

Claims 1, 8, 9, and 18-20 are amended. No claims are added or canceled. Hence, Claims 1-25 are pending in the Application.

I. INTERVIEW SUMMARY

Applicant's representative, Zhichong Gu, responded to Examiner Jianye Wu's phone call on October 10, 2007. The Examiner requested that support for Claims 21-25 be identified. In response, Applicant sent an email to the Examiner stating the support may be found at least in Section [0148].

II. ISSUES RELATING TO 112

Claims 21-25 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. The rejection is respectfully traversed.

As noted in MPEP 2603.02, the subject matter of the claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement. An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Whenever the issue arises, the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. See, e.g., *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991).

First, Claims 21-25 recite features similar to original Claims 2-6. Therefore, because original Claims 2-6 are supported by Applicant's specification and by the

originally presented claim language, the features of Claims 21-25 are supported by Applicant's specification and by the originally presented claim language.

Second, Claims 21-25 recites "The apparatus of Claim 20, wherein the stored sequences of instructions include instructions which, when executed by the processor, cause the processor to further carry out …." Both the apparatus and the stored sequences are recited in the claim language of original Claim 20, from which the claims depend.

Third, paragraph [0148] of Applicant's specification clearly states, "The invention is related to the use of computer system 1000 for updating a routing table based on an adaptive, deterministic ant routing algorithm. According to one embodiment of the invention, computer system 1000 provides for such updating in response to processor 1004 executing one or more sequences of one or more instructions contained in main memory 1006." Respectfully, with these disclosures, a person of ordinary skill would understand that Applicant is in possession of the claimed invention, and in particular, the features as recited in Claims 21-25.

For these reasons, reconsideration and removal of the rejection is respectfully requested.

III. ISSUES RELATING TO 103(a) —*TERUHI, MOY* AND *RFC 2676*

Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Teruhi et al., U.S. Pub. No. 2003/0072269 (hereinafter *Teruhi*) and J. Moy et al., IETF RFC 1247 "OSPF Version 2", July 1991 (hereinafter *Moy*) and further in view of Apostolopoulos et al., INTF RFC 2676 "QoS Routing Mechanisms and OSPF Extensions", August 1999 (hereinafter *RFC 2676*). The rejection is respectfully traversed.

Claim 1

Claim 1 is directed to a method of updating a routing table, and recites:

> selecting, from a set of routers, a particular router that is associated with a first time that is a shortest time among all times associated with routers in the set of routers, **wherein the first time has been updated with a previous time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**;
> sending a first data packet to the particular router;
> receiving a second data packet that indicates a second time taken for the first data packet to travel to a destination indicated by the first data packet, wherein the destination indicated by the first data packet is the same as the previous destination indicated by the previous data packet;
> updating the first time based on the second time; and
> updating the routing table based on information contained in the second data packet.
> (Emphasis added)

Claim 1 provides for a second packet to travel back to a router that has forwarded a first data packet, thereby bringing back information collected by the first data packet. Specifically, Claim 1 features receiving a second data packet that indicates a second time taken for the first data packet to travel to a destination indicated by the first data packet. Such a method is neither disclosed nor suggested by *Teruhi*, *Moy* or *RFC 2676*.

Teruhi

Teruhi pertains to a multimedia data delivery system that comprises a source node 11 and a destination node 12. In a conventional arrangement, the source and destination nodes involved in data delivery use RTP for data packets and RTCP for control packets. As disclosed in FIG. 1 of *Teruhi*, the source node and the destination node may transfer the multimedia data over multiple routes (31, 32). According to *Teruhi,* the source node and the destination node may exchange quality information for each of the multiple routes between them. As disclosed in FIG. 4 and FIG. 5 of *Teruhi*, the quality information is packet loss 71, jitter 72, and delay 74.

The nodes involved in the multimedia data delivery are originators and consumers

of data packets between them. In particular, these nodes are not routers, as recited in Claim 1, which, for example, may explore routing paths.

Teruhi fails to disclose a number of features in Claim 1. For example, Claim 1 recites "receiving a second data packet that indicates a second time taken for the first data packet to travel to a destination indicated by the first data packet." On the other hand, *Teruhi* only discloses receiving overall quality information related to a specific route. There is no disclosure in *Teruhi* that the delay 74 features a time that a control packet (a RTCP-SR packet) takes to travel to the destination node. Therefore, the control packet is not the first data packet recited in Claim 1. The delay 74 as disclosed in *Teruhi* is in fact an average time that data packets of a stream (RTP packets) travel from the source node to the destination node. There is no rationale for *Teruhi* to measure only delay of a single control packet (RTCP packet) so as to represent the quality of the delay for data packets (RTP packets) of a stream over any particular route.

Moy and *RFC 2676*

Moy is a protocol specification for OSPF version 2. OSPF is a link-state based protocol where links are formed between adjacent routers and information about the links are propagated among routers involved in the OSPF protocol operation (e.g., flood). Using the information about the links between adjacencies, any such router may calculate a shortest path between any two routers based on the Dijkstra algorithm.

RFC 2676 is a proposed extension to the OSPF protocol. Under this proposed extension, link bandwidth and link propagation delay information between two neighboring routers may be exchanged.

Like *Teruhi*, *RFC 2676* only discloses overall delay information related to a specific link. There is no disclosure in *RFC 2676* that time information for a first data

packet over a particular path that consists of links between neighboring routers is carried back by a second data packet, as featured in Claim 1. For example, there is no disclosure in *RFC 2676* that the link delay is a time that a single link state advertisement takes to travel to a neighbor. Therefore, the link state advertisement is not a first data packet as recited in Claim 1.

Examiner's Response to Applicant's Previous Amendments/Remarks

Page 19 of the present Office Action states, "RTCP-SR packet is a Real Time Control Packet. 74 DLSR field of RTCP-SR packet by definition is 'DELAY SINCE LAST SR'. Therefore, when RTCP-SR reaches destination, DLSR is a time a packet to travel to the destination node."

Respectfully, this is a mischaracterization of the reference. "DELAY SINCE LAST SR", as referred to in the reference and by the Office Action, is not a delay of any specific packet. Rather, 72 Inter-arrival jitter, 73 last SR timestampe, and 74 delay in *Teruhi* are information on the quality of data delivery (i.e., 102 RTP of FIG. 2 in *Teruhi*) since last status report. *See Id.* at paragraph [0043]. Furthermore, this "last" word in the reference refers to the last status report (SR), not last packet in the data delivery, as argued by the Office Action. This is clearly shown in FIG. 9 of the reference, where two RTCP-SRs are apart by δT with other packets in between.

Indeed, if 74 delay is a delay time of a single packet as alleged by the Office Action, 73 inter-arrival jitter in the same RTCP-SR packet will be rendered meaningless, as by definition an inter-arrival jitter requires at least three packets (therefore there can be a variation between at least two inter-arrival values). Clearly, the assertion in the Office Action has no support in the reference and is erroneous.

Page 19 of the present Office Action further argues, "74 DLSR is a time that data

packets of a stream (RTP packets) travel from the source node to the destination node, but not an average time." As shown above, this is an interpretation that simply finds no support in *Teruhi* and in fact is illogical considering the fact that the quality of service in the status report includes inter-arrival jitter.

Since *Teruhi*, *Moy* and *RFC 2676* fail to disclose the features of Claim 1, any combination of the two cannot disclose every feature of Claim 1.

For the reasons given above, Claim 1 is patentable over *Teruhi, Moy* and *RFC 2676*. Reconsideration is respectfully requested.

Claims 2, 4, 5, and 7

Claims 2, 4, 5, and 7 are dependent upon and thus include each and every feature of Claim 1 discussed above. Therefore, it is respectfully submitted that Claims 2, 4, 5, and 7 are allowable for at least the reasons given above with respect to Claim 1. Reconsideration is respectfully requested.

IV. ISSUES RELATING TO 103(a) —*TERUHI* AND *RFC 2676*

Claims 3 and 6 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over *Teruhi* in view of *RFC 2676*. The rejection is respectfully traversed.

Claims 3 and 6 are dependent upon and thus include each and every feature of Claim 1 discussed above. Therefore, it is respectfully submitted that Claims 3 and 6 are allowable for at least the reasons given above with respect to Claim 1. Reconsideration is respectfully requested.

V. ISSUES RELATING TO 103(a) —*MOY* AND *RFC 2676*

Claims 8 and 18-20 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over *Moy* in view of *RFC 2676*. The rejection is respectfully traversed.

Claims 8 and 18-20 each recite similar features as those discussed above with respect to Claim 1. For example, Claim 18 is a computer-readable medium claim that corresponds to method Claim 1. Claim 19 is recited in a format allowable by 35 USC §112, and corresponds to method Claim 1 discussed above. Claim 20 is an apparatus claim that corresponds to method Claim 1. Therefore, Claims 8 and 18-20 are patentable for at least the same reasons discussed above as to Claim 1. Reconsideration is respectfully requested.

VI. ISSUES RELATING TO 103(a) —*CARO* AND *RFC 2676*

Claims 1-25 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over *Gianni Di Caro* et al., "AntNet: Distributed Stigmergetic Control for Communications Networks", Journal of Artificial Intelligence Research, 12/1998 (hereinafter *Caro*) in view of *RFC 2676*. The rejection is respectfully traversed.

Claim 1

Claim 1 recites selecting, from a set of routers, a particular router that is associated with a first time that is a shortest time among all times associated with routers in the set of routers, **wherein the first time has been updated with a previous time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**. Claim 1 also recites sending a first data packet to the particular router. Claim 1 further recites receiving a second data packet that indicates a second time taken for the first data packet to travel to a destination indicated by the first data packet, wherein the destination indicated by the first data packet is the same as the previous destination indicated by the previous data packet. Respectfully, neither *Caro* nor *RFC 2676* discloses these features.

CARO

Caro describes an AntNet in which entries in a routing table (*See* Fig. 1 on page 325) stores probabilistic values calculated based on the statistics collected by ant packets. According to *Caro*, ant packets are generated periodically (item 1 on page 326). The destinations of the ant packets are statistically determined by formula (2), which is statistically based on the data traffic pattern. *Id.* At each intermediate node, each ant packet, known as traveling agent, is sent to a neighbor that is selected based on a probability determined by the probabilistic values stored in the routing table (item 3 on page 327; formulas (3) and (4) therein). A backward ant is sent back on the same path after the ant packet arrives at its destination (item 6 on page 328). The information carried by the backward ant is then used to update the probabilistic values in the routing table (*see, e.g.,* formulas (5) and (6) on page 329).

Caroi fails to disclose a number of features in Claim 1. For example, Claim 1 recites "selecting, from a set of routers, a particular router that is associated with a first time that is a shortest time among all times associated with routers in the set of routers, **wherein the first time has been updated with a previous time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**" (emphasis added). On the other hand, *Caro* only discloses selecting a neighbor based on probabilistic values stored in the routing table. There is no disclosure in *Caro* that the probabilistic values are a previous time taken for a previous data packet to travel to a previous destination indicated by the previous data packet, as featured in Claim 1.

RFC 2676

The Office Action on page 8 correctly concedes that *Caro* "**is silent on** the criterion is that the first packet is predicted to reach the destination in a shortest time (the first time)." However, the Office Action states that "[i]n the same field of endeavor, RFC

2676 further teaches routing the shortes path in terms of traveling time (delay, line 8 of first paragraph in Section 1.2, Page 5)."

Respectfully, as previously discussed with respect to the 103 rejection involving *Teruhi*, *RFC 2676* only discloses overall delay information related to a specific link. There is no disclosure in *RFC 2676* for selecting, from a set of routers, a particular router that is associated with a first time that is a shortest time among all times associated with routers in the set of routers, **wherein the first time has been updated with a previous time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**, as featured in Claim 1.

Since both *Caro* and *RFC 2676* fail to disclose this selecting feature, it follows that neither reference can possibly disclose sending a first data packet to the particular router, and receiving a second data packet that indicates a second time taken for the first data packet to travel to a destination indicated by the first data packet, wherein the destination indicated by the first data packet is the same as the previous destination indicated by the previous data packet, as featured in Claim 1.

VIOLATION OF PRINCIPLES OF OPERATION

The combination of the two references conflict with the teaching of at least one of the references, and violates at least one principle of operation of the references.

A probabilistic model is fundamental to the operation of *Caro*. As described in the reference, all the steps, generating packets, selecting neighbor nodes to forward, updating routing information, etc., are all inextricably tied to the probabilistic model. For example, as *Caro* indicates on page 328 (item 7.i), "[t]he **statistical model** has to be able to capture this variability and to follow in a robust way the fluctuations of the traffic. **This model plays a critical role** in the routing table updating process (see item (ii)

below)" (emphasis added). Furthermore, according to *Caro*, routing performance is improved under the AntNet because of the use of probabilistic entries (on page 330, "**The use of probabilistic entries is very specific to AntNet** and we observed it to be **effective**, improving the performance, in some cases, even by 30%-40%. Routing tables are used in **a probabilistic way not only** by the ants **but also** by the data packets. This **has been observed to improve** AntNet performance, which means that the way the routing tables are built in AntNet is **well matched with a probabilistic distribution** of the data packets over all the good paths" (emphasis added)).

A combination of *RFC 2676* and *Caro*, as suggested by the Office Action, completely vitiates the advantages gained by the probabilistic model of *Caro*, rendering the critical role played by the probabilistic model in *Caro* unfulfilled.

For these reasons, a proposed combination of *Caro* and *RFC 2676* violates at least one principle of operation of the references.

Claims 8, 9 and 18-20

Claims 8, 9 and 18-20 each recite similar features as those discussed above with respect to Claim 1. For example, Claim 18 is a computer-readable medium claim that corresponds to method Claim 1. Claim 19 is recited in a format allowable by 35 USC §112, and corresponds to method Claim 1 discussed above. Claim 20 is an apparatus claim that corresponds to method Claim 1. Therefore, Claims 8, 9 and 18-20 are patentable for at least the same reasons discussed above as to Claim 1. Reconsideration is respectfully requested.

Claims 2-7, 10-17 and 21-25

Claims 2-7, 10-17 and 21-25 are dependent upon and thus include each and every feature of Claim 1 discussed above. Therefore, it is respectfully submitted that Claims 2-

7, 10-17 and 21-25 are allowable for at least the reasons given above with respect to Claim 1.

VII. CONCLUSION

For the reasons set forth above, Applicant respectfully submits that all pending claims are patentable over the art of record, including the art cited but not applied. Accordingly, allowance of all claims is hereby respectfully solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Respectfully submitted,

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